

ADDITIONAL RECORDS OF ENTOCYTHERID OSTRACODS INFESTING BURROWING CRAYFISHES, WITH DESCRIPTIONS OF FIVE NEW SPECIES

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Abstract.—New records of entocytherids on burrowing crayfishes are recorded from Alabama, Kentucky, Mississippi, Ohio, Tennessee, Virginia, and West Virginia. Represented are species of the genera *Ankylocythere* (5 species), *Ascetocythere* (3), *Dactylocythere* (9), *Donnaldsoncythere* (1), *Lordocythere* (1), *Plectocythere* (1), and *Uncinocythere* (1). New species include *Ankylocythere prolata* from Baldwin County, Alabama, *Dactylocythere guyandottae* from Wyoming County, West Virginia, *Dactylocythere lepta* from Powell County, Kentucky, *Dactylocythere pygidion* from Claiborne County, Tennessee, and *Plectocythere kentuckiensis* from Powell County, Kentucky.

Continued studies of burrowing crayfishes by Raymond F. Jezerinac and G. Whitney Stocker of The Ohio State University, Newark, have disclosed many new records of infestations of entocytherid ostracods and have revealed the existence of five previously undescribed species. Citations of new locality records for species described previously and descriptions of the new ones are presented here. The identities of the host crayfishes were furnished by Messrs. Jezerinac and Stocker.

Except as noted, all of the specimens cited are deposited in the National Museum of Natural History, Smithsonian Institution. References to the original descriptions of the crayfish hosts are omitted from the "Literature Cited" but may be found in Hobbs (1989).

Ankylocythere burkeorum Hobbs III

Ankylocythere burkeorum Hobbs III, 1971: 137, fig. 1a-c.

New record.—Mississippi: Jackson County [Escatawpa Basin], burrows along ditch 2.8 mi (4.5 km) N of Hurley, 2.1 mi (3.4 km) S of Harleston, 22 Mar 1988, Dave Christman, George W. Stocker, and Ray-

mond F. Jezerinac; host: *Cambarus* (*L.*) *ludovicianus* Faxon, 1884; entocytherid associates; none.

Ankylocythere copiosa (Hoff)

Entocythere copiosa Hoff, 1942:69, figs. 9-13.

Ankylocythere copiosa.—Hart, 1962:126.

New record.—Kentucky: Madison County [Kentucky Basin], burrows in wet area at Central Kentucky Wildlife Area, 9.5 mi (15.2 km) SSE of Richmond, 2.7 mi (4.3 km) NE of Bobtown, 26 Mar 1988, G.W.S., D.C., Roger F. Thoma, and R.F.J., host: *Cambarus* (*J.*) *batchi* Schuster, 1973; entocytherid associates; *Dactylocythere macroholca* Hobbs & Hobbs III, 1970, *Uncinocythere simondsi* (Hobbs & Walton, 1960).

Ankylocythere prolata, new species

Fig. 1a-c

Diagnosis.—Male with eye pigmented and located about 0.17 shell length from anterior margin. Shell (Fig. 1b) flattened ventrally, gently arched dorsally and with maximum height slightly posterior to midlength where about 1.3 times height at level of eye; margin entire, lacking emarginations and

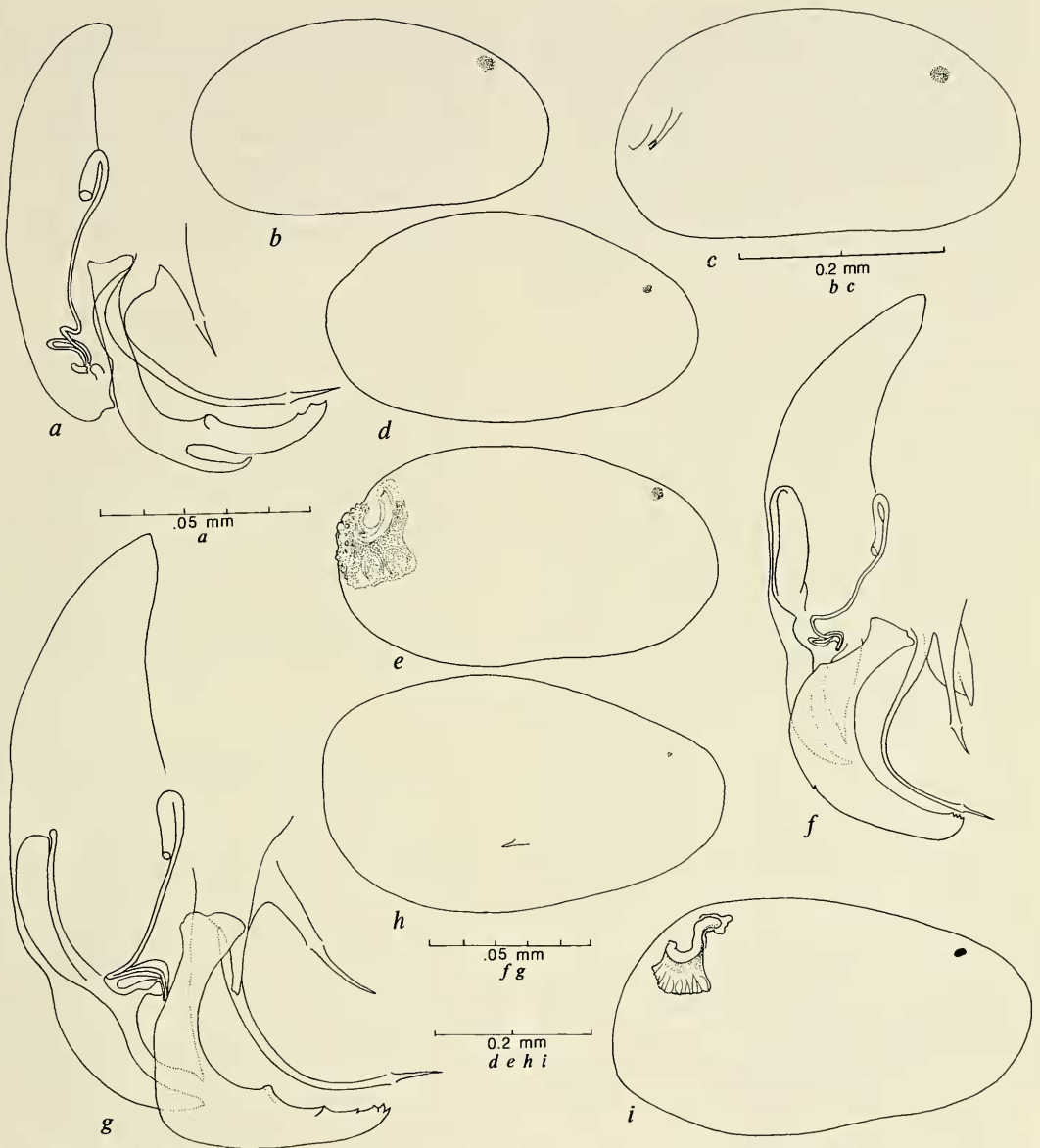


Fig. 1. a-c, *Ankylocythere prolata*, n. sp.; d-f, *Dactylocythere guyandottae*, n. sp.; g-i, *Dactylocythere lepta*, n. sp. (b, d, h, Shell of male; c, e, i, Shell of female; a, f, g, Copulatory complex of male).

prominences. Submarginal setae present except dorsally between level of eye and copulatory complex. Shell length of male 342–357 ($\bar{X} = 351$) μm ; shell height 179–200 ($\bar{X} = 186$) μm .

Copulatory complex (Fig. 1a) with arched peniferum, rounded ventrally and bearing

small subangular prominence near cephalo-ventral extremity. Clasping apparatus with vertical and horizontal rami subequal in length (or latter longer than former) and disposed at angle of about 103 degrees; vertical ramus almost straight; horizontal one with concave preaxial margin bearing prominent

tooth proximal to midlength and 3 apical denticles; postaxial surface of horizontal ramus with long curved talon arising proximal to large tooth on preaxial border and extending slightly distal to midlength of ramus. Dorsal finger about 0.33 length of ventral finger; latter bent at approximately right angle at end of proximal 0.25, and gently curved in same direction at base of distal 0.40.

Triunguis female.—Eye located about 0.40 shell length from anterior end. Shell (Fig. 1c) very weakly concave ventrally and slightly more highly vaulted than that of male; greatest height slightly posterior to midlength where about 1.2 times that at level of eye. Submarginal setae present except dorsally posterior to eye. Shell length 342–378 (\bar{X} = 366) μm ; shell height 207–228 (\bar{X} = 213) μm . Genital papilla long and slender.

Type locality: Crayfish burrows along d'Olide Creek at U.S. Hwy 98, 0.9 mile (1.4 km) south of Bridgehead (the same locality cited by Fitzpatrick 1978:752), Baldwin County, Alabama. The type series was infesting burrowing crayfish collected by D.C., G.W.S., R.F.J., and J. F. Fitzpatrick, Jr.

Disposition of types: The holotypic male and allotypic female are deposited in the National Museum of Natural History (Smithsonian Institution), USNM 235511 and 235512, respectively. Paratypes are in the collections of H. H. Hobbs III and the Smithsonian Institution.

Host: *Cambarus (Lacunicambarus) mil-tus* Fitzpatrick, 1978.

Entocytherid associates: None.

Range and specimens examined: Known only from the type locality; seventeen specimens were collected on 22 March 1988 (see "Type locality" above).

Relationships: *Ankylocythere prolata* has its closest affinities with those species possessing a long talon on the horizontal ramus of the clasping apparatus: *A. ancyla* Crawford, 1965; *A. harmani* Hobbs, 1966; *A. hobbsi* Hoff, 1944; and *A. spargosis* Andol-shek & Hobbs, 1986. It is readily distin-

guishable from the last two in that nowhere along its length is the talon bent sharply. It differs from all four of them in that the horizontal and vertical rami are subequal in length or the former is longer than the latter.

Etymology: *L. prolatus* = prolonged. So named because of the comparatively long horizontal ramus of the clasping apparatus of the male.

Ankylocythere sinuosa (Rioja)

Entocythere sinuosa Rioja, 1942:695, fig. 20.
Ankylocythere sinuosa.—Hart, 1962:127.

New record.—Tennessee: Rhea County [Tennessee Basin], Morgan Creek, 4.0 mi (6.4 km) NW of Dayton, 3 mi (4.8 km) SE of Morgan Springs, 25 Mar 1988, D.C., R.F.T., G.W.S., and R.F.J., host: *Cambarus (J.)* sp.?, entocytherid associates: *Dactylocythere astraphyes* Hobbs and Walton, 1977, and *Dt. brachystrix* Hobbs and Walton, 1966.

Ankylocythere tiphophila (Crawford)

Entocythere tiphophila Crawford, 1959:173, figs. 31–37.

Ankylocythere tiphophila.—Hart, 1962:128.

New record.—Tennessee, Campbell County [Clinch Basin], burrows along stream at Cove Lake Park campground, 0.1 mi (0.16 km) N of Caryville, 7.2 mi (11.5 km) SW of La Follette, 12 Aug 1987, G.W.S. and R.F.J., host: *Cambarus (J.) dubius* Faxon, 1884, entocytherid associate: *Dactylocythere astraphes* Hobbs & Walton, 1977.

Ascetocythere didactylata Hobbs & Hart

Ascetocythere didactylata Hobbs & Hart, 1966:38, figs. 17, 18.

New record.—Tennessee: Claiborne County [Powell Basin], (1) burrows in seep 0.6 mi (0.96 km) N of Riverside, 0.8 mi (1.3 km) SE of poplar Grove, 23 July 1987, G.W.S., D.C., and R.F.J., host: *Cambarus (J.) dubius*, entocytherid associate: *Dactylo-*

cythere pygidion, new species; (2) burrows adjacent to spring, 10.8 mi (17.3 km) SW of Middlesboro, 2.8 mi (4.5 km) NE of Pleasant, 11 Aug 1987, G.W.S. and R.F.J., host: *Cambarus (J.) dubius*, entocytherid associates: *Dactylocythere mecoscapa* Hobbs & Walton, 1960, and *Donnaldsoncythere donnaldsonensis* (Klie, 1931).

Ascetocythere sclera Hobbs & Hart

Ascetocythere sclera Hobbs & Hart, 1966: 38, figs. 15, 16.

New records.—Virginia: Highland County [Potomac Basin], burrows along ditch 1.0 mi (1.6 km) SW of Mill Gap, 4.0 mi (6.4 km) WSW of Muscoe, 23 Jun 1987, G.W.S. and R.F.J., host: *Cambarus (J.) dubius*, entocytherid associate: *Donnaldsoncythere donnaldsonensis*. West Virginia: Clay County [Elk Basin], burrows along ditch 2.5 mi (4 km) NNW of Lizemores, 24.5 mi (39.2 km) E of Charleston, 22 Jun 1987, G.W.S. and R.F.J., host: *Cambarus (J.) dubius*, entocytherid associates: *Dactylocythere* sp. and *Donnaldsoncythere donnaldsonensis*.

Ascetocythere stockeri Hobbs & Peters

Ascetocythere stockeri Hobbs & Peters, 1989: 325, fig. 1.

New record.—West Virginia: Lincoln County [Guyandotte Basin], burrows along ditch 1.5 mi (2.4 km) NE of Atenville 25 mi (40 km) E of Louisa, 21 Jul 1987, G.W.S., D.C., and R.F.J., host: *Cambarus (J.) dubius*, entocytherid associate: *Donnaldsoncythere donnaldsonensis*.

Dactylocythere astraphes Hobbs & Walton

Dactylocythere astraphes Hobbs & Walton, 1977:600, fig. 1.

New record.—Tennessee: (1) Campbell County [Clinch Basin], burrows along stream at Cove Lake State Park campground, 0.1 mi (0.2 km) N of Caryville, 7.2 mi (11.5 km) SW of La Follette, 12 Aug 1987, G.W.S.

and R.F.J., host: *Cambarus (J.) dubius*, entocytherid associate: *Ankylocythere tiphophila* (Crawford, 1959). (2) Rhea County [Tennessee Basin], Morgan Creek, 4.0 mi (6.4 km) NW of Dayton, 3.0 mi (4.8 km) SE of Morgan Springs, 25 Mar 1988, D.C., R.F.T., G.W.S., and R.F.J., host: *Cambarus (J.)* sp.?, entocytherid associates: *Ankylocythere sinuosa* and *Dactylocythere brachystris* Hobbs & Walton, 1966.

Dactylocythere brachystris
Hobbs & Walton

Dactylocythere brachystris Hobbs & Walton, 1966:2, fig. 1a–d.

New record.—Tennessee: Rhea County [Tennessee Basin], Morgan Creek, 4.0 mi (6.4 km) NW of Dayton, 3.0 mi (4.8 km) SE of Morgan Springs, 25 Mar 1988, D.C., R.F.T., G.W.S., and R.F.J., host: *Cambarus (J.)* sp.?, entocytherid associates: *Ankylocythere sinuosa*, and *Dt. astraphes*.

Dactylocythere chalaza (Hobbs & Walton)

Entocythere chalaza Hobbs & Walton, 1962: 42, figs. 6–9.

Dactylocythere chalaza.—Hart, 1962:129.

New record.—West Virginia: Greenbrier County [New Basin], burrows along ditch, 0.8 mi (1.3 km) SE of Grassy Meadows, 2.6 mi (4.2 km) S of Dawson, 20 Aug 1988, Tom Jones and G.W.S., host: *Cambarus (J.) dubius*, entocytherid associates: none.

Dactylocythere crawfordi Hart

Dactylocythere crawfordi Hart, 1965:255, figs. 1, 2.

New record.—Ohio: Auglaize County [Miami Basin], burrows along ditch 1.0 mi (1.6 km) E of Gutman, 2.5 mi (4 km) NW of Santa Fe, 7 Jul 1984, Vicki Stocker and G.W.S., host: *Cambarus (L.) diogenes* Girard, 1852, entocytherid associate: *Donnaldsoncythere donnaldsonensis*.

Dactylocythere guyandottae, new species
Fig. 1d-f

Diagnosis.—Male with eye located about 0.14 of shell length from anterior end. Shell (Fig. 1d) elliptical, lacking angles, prominences, and emarginations. Submarginal setae sparse but present except dorsally. Shell length of male 428–450 (\bar{X} = 440) μm ; shell height 228–250 (\bar{X} = 243) μm . Sternal spine lacking.

Copulatory complex (Fig. 1f) with cephalic margin of peniferum undulating and bowed; apex of ventral extremity sharply acute and directed anteriorly. Accessory groove reaching dorsal extremity of spermathecal loop and moderately complex. Clasp apparatus with vertical and horizontal rami joining in broad curve with extremities directed at angle of approximately 85 degrees. Vertical ramus with distinct shoulder on caudal margin and insensibly joined to horizontal ramus; latter without teeth on preaxial border but with unique notch on postaxial border, apical end bearing 4 very small dorsally directed denticles. Finger guard with acute preaxial area and shorter, distally rounded, lamelliform plate flanking it posteriorly.

Triunguis female: Eye located about 0.17 shell length from anterior end. Shell (Fig. 1e) subelliptical with shallow excavation just anterior to midlength; shell length of single female 457 μm ; shell height 236 μm . Genital apparatus consisting of J-shaped rod and pendant amiculum supported by few inverted U-shaped rods and slightly protruding from posterior margin of shell.

Type locality: Crayfish burrows in roadside ditch on State Route 971 at Lilydale, 2.2 miles (3.5 km) southwest of Oceana, 3.7 miles (5.9 km) north of Clear Fork, Wyoming County, West Virginia. This locality is in the Guyandotte-Big Sandy River basin.

Disposition of types: The holotypic male and allotypic female are deposited in the National Museum of Natural History (Smithsonian Institution), USNM 235513 and 235519, respectively. Paratypic males

are in the collections of H. H. Hobbs III and the Smithsonian Institution.

Hosts: *Cambarus (Jugicambarus) dubius* and *Cambarus (Lacunicambarus) diogenes* were preserved in the container from which the type series was obtained. There were no entocytherid associates.

Range and specimens examined: Known only from the type locality where three males and one female were found by G.W.S. and R.F.J. on 6 Jul 1988.

Relationships: Among the closest relatives of this ostracod are *Dt. enoploholca* Hobbs & Walton, 1970, *Dt. isabelae* Hobbs & Peters, 1977, and *Dt. kolura* Hart & Hart, 1971. It differs from the last conspicuously in lacking a caudoventral prominence on the shell and a tooth near midlength of the horizontal ramus of the clasp apparatus. It differs from *Dactylocythere isabelae* in possessing a more robust clasp apparatus, a well defined accessory groove, and a non-bifid finger guard. The chief difference between *Dt. guyandottae* and *Dt. enoploholca* is the lack of teeth on the preaxial border of the clasp apparatus, and a much broader finger guard in the former. It is also the only member of the genus *Dactylocythere* in which a notch is present on the postaxial border of the horizontal ramus of the clasp apparatus.

Etymology: This ostracod bears the name of the Guyandotte River basin where its only known locality is located.

Dactylocythere lepta, new species
Fig. 1g-i

Diagnosis.—Male with eye located about 0.17 shell length from anterior margin, much reduced, represented in some specimens by fewer than a dozen pigment granules. Shell (Fig. 1h) subovate but sometimes with posteroventral angle. Submarginal setae present except dorsally posterior to the eye. Shell length of male 478–514 (\bar{X} = 495) μm ; shell height 257–286 (\bar{X} = 272) μm . Sternal spine slender and directed posteriorly.

Copulatory complex (Fig. 1g) with penif-

erum convex posteriorly and with shallow emargination on postaxial margin at level of penis; apex of ventral extremity directed anteriorly. Accessory groove bilobed and reaching about midlength of spermatic loop. Clasping apparatus with vertical and horizontal rami joining at 90 degree angle. Vertical ramus bent at angle of 25 degrees slightly distal to midlength, lacking shoulder on postaxial surface. Horizontal ramus with 3 teeth on preaxial border, proximal-most largest, situated near midlength, penultimate tooth slightly closer to ultimate than to proximal tooth; 3 up-turned apical denticles following ultimate tooth. Finger guard strikingly slender, postaxial border concave; distal extremity subtruncate.

Triunguis female: Eye located about 0.20 shell length from anterior end. Shell (Fig. 1i) larger but otherwise as in male; shell length 493–571 (\bar{X} = 521) μm ; shell height 286–328 (\bar{X} = 305) μm . Genital apparatus consisting of slightly tilted S-shaped rod and short amiculum hanging pendant below ventral arm of rod.

Type locality: Crayfish burrows in roadside ditch 2.0 miles (3.2 km) east of State Route 11 on State Route 15, 1.8 miles (2.9 km) east of Slade, Powell County, Kentucky. This locality is in the Kentucky River basin.

Disposition of types: The holotypic male and allotypic female are deposited in the National Museum of Natural History (Smithsonian Institution), USNM 235514 and 235515, respectively. Paratypes are in the collections of H. H. Hobbs III and the Smithsonian Institution.

Host: *Cambarus (Jugicambarus) dubius*.

Entocytherid associates: *Donnaldsoncythere donnaldsonensis* and *Plectocythere kentuckiensis*, described herein.

Range and specimens examined: Known only from the type locality; 34 specimens were collected from the type locality on 10 Oct 1987 by Paul Matesick, D.C., G.W.S., and R.F.J.

Relationships: *Dactylocythere lepta* probably has its closest affinities with *Dt. as-*

traphes Hobbs & Walton, 1977, an inhabitant of the Tennessee and Cumberland river basins. Most members of both sexes may be distinguished from those of the latter by the reduced eye spots and subangular posteroventral angle of the shell, the males by the angular, as opposed to straight, vertical ramus of the clasping apparatus, and the females by the S-shaped, instead of long-shanked J-shaped, rod of the genital complex.

Etymology: Gr. Leptos = thin, delicate. So named because of the delicate eye spot and the slender finger guard of the male clasping apparatus.

Dactylocythere macroholca
Hobbs & Hobbs

Dactylocythere macroholca Hobbs & Hobbs III, 1970:10, fig. 3a–d.

New record. — Kentucky: Madison County [Kentucky Basin], burrows in wet area in Central Kentucky Wildlife Area, 9.5 mi (15.2 km) SSE of Richmond, 2.7 mi (4.3 km) NE of Bobtown, 26 Mar 1988, G.W.S., D.C., R.F.T., and R.F.J., host: *Cambarus (J.) batchi*; entocytherid associates: *Ankylocythere copiosa* and *U. simondsi*.

Dactylocythere mecoscapha
(Hobbs & Walton)

Entocythere mecoscapha Hobbs & Walton, 1960:19, figs. 17–20.

Dactylocythere mecoscapha. —Hart, 1962: 130.

New records. —Tennessee: Claiborne County [Powell Basin], (1) burrows at spring, 10.8 mi (17.3 km) SW of Middlesboro, 2.8 mi (4.5 km) NE of Pleasant, 11 Aug 1987, G.W.S. and R.F.J., host: *Cambarus (J.) dubius*, entocytherid associates: *Ascetocythere didactylata* and *Donnaldsoncythere donnaldsonensis*. (2) burrows along tributary to Russell Creek, 6.0 mi (9.6 km) NE of Tazewell, 14.5 mi (23.2 km) SE of Middlesboro, 11 Aug 1987, G.W.S. and R.F.J., hosts: *Cambarus (J.) dubius* and *Cambarus (C.)*

sp., entocytherid associates: *Donnaldsoncythere donnaldsonensis* and *Uncinocythere simondsi*.

Dactylocythere pygidion, new species
Fig. 2d–f

Diagnosis.—Male with well defined eye spot located about 0.14 shell length from anterior margin. Shell (Fig. 2f) ovate with concavity anteroventrally and submarginal setae present except dorsally. Shell length of male 493–536 (\bar{X} = 513) μm ; shell height 278–314 (\bar{X} = 291) μm . Sternal spine absent.

Copulatory complex (Fig. 2d) with peniferum bowed posteriorly with faint posterior impression at level just dorsal to penis; apex of ventral extremity directed anteriorly. Accessory groove in form of slender cylinder reaching dorsal margin of spermatic loop. Clasp apparatus with vertical and horizontal rami joining at about 80 degree angle. Vertical ramus only faintly bowed, lacking shoulder on postaxial surface. Horizontal ramus tapering distally, lacking teeth on both pre- and postaxial borders but with 3 apical denticles. Finger guard bearing prominent posteroapical excavation and directed anteroventrally.

Triunguis female: Eye located about 0.29 shell length from anterior end. Shell (Fig. 2e) asymmetrically ovate resulting from posteroventral bulge and posterior notch at level of amiculum; shell length 506–521 (\bar{X} = 514) μm ; shell height 278–300 (\bar{X} = 291) μm . Genital apparatus consisting of J-shaped rod and prominent pleated amiculum, part of which hanging pendant and another extending caudoventrally from area of short arm of J-shaped rod and, in part, protruding beyond caudal margin of shell.

Type locality: Seep, 0.1 mile (0.2 km) north of Canoe Branch on Grove Road, 0.6 mile (1 km) north of Riverside; 0.8 mile (1.3 km) southeast of Poplar Grove, Claiborne County, Tennessee. This locality is in the Powell River Basin.

Disposition of types: The holotypic male and allotypic female are deposited in the National Museum of Natural History (Smithsonian Institution), USNM 235516. Paratypes are in the collections of H. H. Hobbs III and the Smithsonian Institution.

Host: *Cambarus (Jugicambarus) dubius*.

Entocytherid associates: *Ascetocythere didactylata*.

Range and specimens examined: Known only from the type locality; 17 specimens were collected on 23 Jul 1987 by G.W.S., D.C., and R.F.J.

Relationships.—Among its closely allied congeners *Dactylocythere pygidion* seems to be more similar to *Dt. falcata* Hobbs and Walton, 1961, than to *Dt. corvus* Hobbs and Walton, 1977, *Dt. myura* Hobbs and Walton, 1970, and *Dt. prominula* Hobbs and Walton, 1977. Despite the similarities, it differs from *Dt. falcata* in possessing a simple accessory groove that extends dorsally only to the dorsal level of the spermatic loop, and there are three terminal denticles at the apex of the clasping apparatus. In *Dt. falcata* the complex accessory groove extends considerably dorsal to the spermatic loop, and the apex of the clasping apparatus usually lacks denticles.

Etymology: Gr. Pygidion = rump. So named because of the prominent posteroventral prominence on the shell of all of the females and a hint of such in some of the males.

Donnaldsoncythere donnaldsonensis (Klie)

Entocythere donnaldsonensis Klie, 1931: 334, figs. 1–9.

Donnaldsoncythere donnaldsonensis.—Hart, 1962:131.

New records.—Kentucky: Powell County [Kentucky Basin], burrows along ditch 1.8 mi (2.9 km) E of Slade, 2.7 mi (4.3 km) NW of Pine Ridge, 10 Oct 1987, P.M., D.C., G.W.S., and R.F.J., host: *Cambarus J. dubius*, entocytherid associates: *Dactylo-*

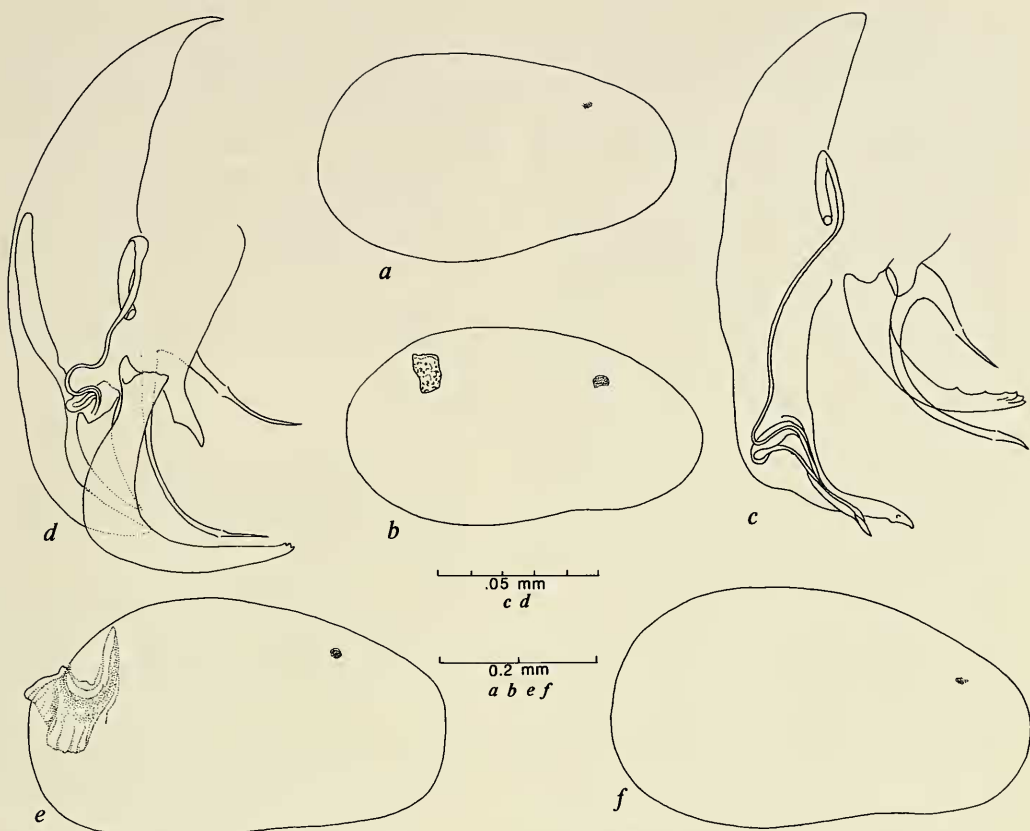


Fig. 2. a-c, *Plectocythere kentuckiensis*, n. sp.; d-f, *Dactylocythere pygidion*, n. sp. (a, f, Shell of male; b, e, Shell of female; c, d, Copulatory complex of male).

cythere lepta and *Plectocythere kentuckiensis*, new species.

Ohio: Augalaize County [Miami Basin], burrows along ditch 1.0 mi (1.6 km) E of Gutman, 2.5 mi (4 km) NW of Santa Fe, 7 Jul 1984, V.S. and G.W.S., host: *Cambarus (L.) diogenes*, entocytherid associate: *Dactylocythere crawfordi*.

Tennessee: Claiborne County [Powell Basin], (1) burrows at spring 10.8 mi (17.3 km) SW of Middlesboro, 2.8 mi (4.5 km) NE of Pleasant, 11 Aug 1987, G.W.S. and R.F.J., host: *Cambarus (J.) dubius*, entocytherid associates: *Ascetocythere didactylata* and *Dactylocythere mecoscapha*. (2) burrows along tributary to Russell Creek, 6.0 mi (9.6 km) NE of Tazewell, 14.5 mi (23.2 km) SE of

Middlesboro, 11 Aug 1987, G.W.S. and R.F.J., host: *Cambarus (J.) dubius* and *C. (C.)* sp.?, entocytherid associates: *Dactylocythere mecoscapha* and *Uncinocythere simondsi*.

Virginia: Highland County [Potomac Basin], (1) burrows along ditch 1.0 mi (1.6 km) SW of Mill Gap, 4.0 mi (6.4 km) WSW of Mustoe, 23 Jun 1987, G.W.S. and R.F.J., host: *Cambarus (J.) dubius*, entocytherid associate: *Ascetocythere sclera*. (2) burrows at spring 1.5 mi (2.4 km) E of Monterey, 5.0 mi (8 km) NE of Vanderpool, 24 Jun 1987, G.W.S. and R.F.J., host: *Cambarus (J.) monongalensis* Ortmann, 1905, entocytherid associate: none.

West Virginia: (1) Clay County [Elk Ba-

sin], burrows along ditch 2.5 mi (4 km) NNW of Lizemores, 24.5 mi (39.2 km) E of Charleston, 22 Jun 1987, G.W.S. and R.F.J., host: *Cambarus (J.) dubius*, entocytherid associates: *Ascetocythere sclera* and *Dactylocythere* sp.? (2) Greenbrier County [Kanawha Basin], burrows along ditch at Summit Lake National Forest campground, 6 mi (9.6 km) ENE of Richwood, 13.0 mi (20.8 km) SE of Cowen, 23 Jun 1987, G.W.S. and R.F.J., hosts: *Cambarus (C.) cavatus* Hay, 1902, *C. (J.) dubius*, and *C. (J.) monongalensis*, entocytherid associates: none. (3) Greenbrier County [New Basin], burrows at cave on U.S. Hwy 219, 1.25 mi (2 km) SW of Renick, 2.5 mi (4 km) NW of Spring Creek, 20 Aug 1988, T.J. and G.W.S., host: *Cambarus (P.) nerterius*, Hobbs, 1964, entocytherid associate: *Uncinocythere simondsi*. (4) Kanawha County [Kanawha Basin], burrows along ditch 3.5 mi (5.6 km) NW of Delva, 22.0 mi (35.2 km) SE of Charleston, 22 Jun 1987, G.W.S. and R.F.J., host: *Cambarus (J.) dubius*, associates: none. (5) Lincoln County [Guyandotte Basin], burrows in seep 1.5 mi (2.4 km) NE of Atenville, 25.0 mi (40 km) E. of Louisa, 21 Jul 1987, G.W.S., D.C., and R.F.J., host: *Cambarus (J.) dubius*, associate: *Ascetocythere stockeri*. (6) Monroe County [Kanawha Basin], burrows along ditch 0.1 mi (0.2 km) NW of Gap Mill, 1.0 mi (1.6 km) SE of Red Mill, 18 Aug 1988, T.J. and G.W.S., host: *Cambarus (J.) dubius*, associates: none. (7) Pocahontas County [Kanawha Basin], seep 4.9 mi (7.8 km) NW of Woodrow, 9.7 mi (15.5 km) NW of Marlinton, 23 Jun 1987, G.W.S. and R.F.J., hosts: *Cambarus (C.) carinirostris* and *Cambarus (J.) monongalensis*, associates: none. (8) Pocahontas County [Kanawha Basin], ditch and seep 1.0 mi (1.6 km) S of Thornwood, 3.2 mi (5.1 km) E of Barton, 23 Jun 1987, G.W.S. and R.F.J., hosts: *Cambarus (C.) carinirostris* and *C. (J.) monongalensis*, associates: none. (9) Pocahontas County [Kanawha Basin], burrows along ditch at Arbovale, 1.5 mi (2.4 km) NNE of Greenbank, 23 Jun 1987, G.W.S. and R.F.J., hosts: *Cambarus*

(*J. dubius* and *C. (J.) monongalensis*, associates: none. (10) Tucker County [Monongahela Basin], seep 0.1 mi (0.2 km) N of Gladwin, 9.2 mi (14.7 km) SE of Parsons, 26 Jun 1987, G.W.S. and R.F.J., host: *Cambarus (J.) monongalensis*, associates: none. (11) Wyoming County [Guyandotte Basin], burrows in ditch along St. Rte. 971 at Lilydale, 6 Jul 1988, G.W.S. and R.F.J., hosts: *Cambarus (J.) dubius* and *C. (L.) diogenes*, entocytherid associate: *Dactylocythere guyandottae*.

Lordocythere petersi Hobbs & Hobbs

Lordocythere petersi Hobbs & Hobbs III, 1970:16, fig. 9.

New record.—Tennessee: Morgan County [Tennessee Basin], burrows in ditch at Petros-Joiner School yard, 1.5 mi (2.4 km) W of Union, 11.1 mi (17.8 km) WNW of Oak Ridge, 24 July 1987, D.C., G.W.S. and R.F.J., host: *Cambarus (L.) acanthura* Hobbs, 1981, entocytherid associates: none.

Plectocythere kentuckiensis, new species

Fig. 2a-c

Diagnosis.—Male with eye spots reduced and located about 0.25 shell length from anterior margin. Shell (Fig. 2a) ovate with broad shallow concavity ventrally about level of eye spot. Submarginal setae present except dorsally. Shell length 440–493 (\bar{X} = 448) μ m; shell height 250–278 (\bar{X} = 263) μ m.

Copulatory complex (Fig. 2c) with ventral part of peniferum very slightly swollen and produced in tapering slender, gently undulating projection terminating in 3 tuberculiform prominences; penis emerging from digitiform extension borne on projection near its base; neither prostatic or spermatic element of penis as long as clasping apparatus. Clasping apparatus forming gentle arc, not divisible into horizontal and vertical rami; postaxial border entire; preaxial bor-

der with 3 subequally-spaced teeth in distal third, apex bearing 3 terminal denticles. Ventral finger about twice as long as dorsal finger and gently curved along proximal three-fifths.

Triunguis female. — Eye weakly pigmented and situated 0.26 shell length from anterior margin (Fig. 2b). Shell ovate with shallow ventral concavity in anterior half sometimes more conspicuous than that in male. Submarginal setae present except dorsally. Shell length 457–478 (\bar{X} = 469) μm ; shell height 250–278 (\bar{X} = 265) μm . Genital apparatus consisting of hyaline globular mass covered with brown, presumably foreign, finely-particulate matter.

Type locality: Crayfish burrows in roadside ditch 2.0 miles (3.2 km) east of State Route 11 on State Route 15, 1.8 miles (2.9 km) E of Slade, Powell County, Kentucky. This locality is in the Kentucky River basin.

Disposition of types: The holotypic male and allotypic female are deposited in the National Museum of Natural History (Smithsonian Institution), USNM 235517 and 235518, respectively. Paratypes are in the collections of H. H. Hobbs III and the Smithsonian Institution.

Host: *Cambarus (Jugicambarus) dubius*.

Entocytherid associates: *Donnaldsoncythere donnaldsonensis* and *Dactylocythere lepta*, described above.

Range and specimens examined: Known only from the type locality. Thirteen specimens (9 males and 4 females) were obtained from the crayfish collected on 10 Oct 1987 by P.M., D.C., G.W.S., and R.F.J.

Relationships: *Plectocythere kentuckiensis* is the fourth species to be assigned to this genus, the range of which is circumscribed by four localities in Kentucky: two in Bell County (the type localities of *P. crotaphis* Hobbs III, 1965, and *P. odelli* Norden, 1977), one in Letcher County (the type locality of *P. johnsonae* Hobbs & Hart, 1966), and that cited above in Powell County. They also infest the same host, *Cambarus (Jugicambarus) dubius* (*Cambarus carolinus*). — Hobbs & Hart, 1966, and Hobbs III, 1969,

=*Cambarus (J.) dubius*). These are closely allied forms, and which of the three is most closely allied to *P. kentuckiensis* is problematical. The undulating ventral extension of the peniferum resembles that in *P. crotaphis* and *P. odelli* more closely than it does that of *P. johnsonae* which is only slightly curved, but the undulation is much weaker in *P. kentuckiensis*, and whereas in *P. crotaphis* and *P. odelli* the extension is directed caudally, that in *P. kentuckiensis* is disposed caudoventrally. Moreover the prominence from which the penis emerges originates at the base of the extension, much proximal to its tip. Three features of *P. kentuckiensis* seem to be unique in the species group: both the spermatic and prostatic elements of the penis are shorter than the clasping apparatus; the terminal end of the peniferal extension bears 2 or 3 small tuberculiform lobes; and the teeth and apical denticles on the clasping apparatus are sharply defined and clearly positioned on the postaxial border of the apparatus.

Ucinocythere simondsi
(Hobbs & Walton)

Entocythere simondsi Hobbs & Walton, 1960:17, figs. 1–10.

Ucinocythere simondsi. — Hart, 1962:123.

New record. — Kentucky: Madison County [Kentucky Basin], burrows at Central Kentucky Wildlife Area, 9.5 mi (15.2 km) SSE of Richmond, 2.7 mi (4.3 km) NE of Bobtown, 26 Mar 1988, G.W.S., D.C., R.F.T., and R.F.J., host: *Cambarus (J.) batchi*, entocytherid associates: *Ankylocythere copiosa* and *Dactylocythere macroholca*.

Tennessee: Claiborne County [Powell Basin] burrows along tributary to Russell Creek, 6.0 mi (9.6 km) NE of Tazewell, 14.5 mi (23.2 km) SE of Middlesboro, 11 Aug 1987, G.W.S. and R.F.J., hosts: *Cambarus (C.)* sp.? and *C. (J.) dubius*, entocytherid associates: *Dactylocythere mecoscapa* and *Donnaldsoncythere donnaldsonensis*.

West Virginia: Greenbrier County [Kanawha Basin], cave on U.S. Hwy 219, 1.25 mi (2.0 km) SW of Renick, 2.5 mi (4 km) NW of Spring Creek, 20 Aug 1988, T.J. and G.W.S., host: *Cambarus (P.) nerterius*, entocytherid associate: *Donnaldsoncythere donnaldsonensis*.

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